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1: J Gen Microbiol. 1983 Aug;129(8):2521-9.

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The effect of beta-galactosides on the protonmotive force and growth of Escherichia coli.

Ahmed S, Booth IR.

The effect of three beta-galactosides on the components membrane potential ($\Delta\psi$) and pH gradient (ΔpH) of protonmotive force and growth of Escherichia coli has been examined. A good correlation between the reduction of the protonmotive force and growth inhibition was observed. Thus some galactosides had little effect on either the protonmotive force or growth while lactose diminished the protonmotive force and caused growth inhibition. This effect of lactose was dependent on the ionic composition of the growth media. In Medium A (77 mM- Na^+ , 85 mM- K^+) lactose diminished $\Delta\psi$ but had no effect on ΔpH . Growth inhibition was transient at an external pH 6.0 but complete at pH 7.5. In medium KA (approximately 1 mM- Na^+ , 162 mM- K^+) ΔpH was diminished and $\Delta\psi$ was not affected and consequently growth inhibition was complete at pH 6.0. In medium NA (163 mM- Na^+ , 20 mM- K^+) lactose had little effect on $\Delta\psi$, ΔpH or growth. These data support Skulachev's hypothesis of buffering of the protonmotive force by K^+ and Na^+ gradients.

PMID: 6313859 [PubMed - indexed for MEDLINE]

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